प्रश्न पुस्तिका / **QUESTION BOOKLET**
विषय / **Subject :**

Civil Engineering

कोड / **Code : 03**

पुस्तिका में पृष्ठों की संख्या /
Number of Pages in Booklet : **16**

पुस्तिका में प्रश्नों की संख्या /
Number of Questions in Booklet : **100**

Civil Engineering
03
विषय कोड (A) बुकलेट सीरीज

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समय / Time : **2 घंटे / Hours**   पूर्णांक / Maximum Marks : 100

INSTRUCTIONS
1. Answer all questions.
2. All questions carry equal marks.
3. Only one answer is to be given for each question.
4. If more than one answers are marked, it would be treated as wrong answer.
5. Each question has four alternative responses marked serially as 1, 2, 3, 4. You have to darken only one circle or bubble indicating the correct answer on the Answer Sheet using **BLUE BALL POINT PEN.**
6. 1/3 part of the mark(s) of each question will be deducted for each wrong answer. (A wrong answer means an incorrect answer or more than one answers for any question. Leaving all the relevant circles or bubbles of any question blank will not be considered as wrong answer.)
7. The candidate should ensure that Series Code of the Question Paper Booklet and Answer Sheet must be same after opening the envelopes. In case they are different, a candidate must obtain another Question Paper of the same series. Candidate himself shall be responsible for ensuring this.
8. Mobile Phone or any other electronic gadget in the examination hall is strictly prohibited. A candidate found with any of such objectionable material with him/her will be strictly dealt as per rules.
9. Please correctly fill your Roll Number in O.M.R. Sheet. 5 marks will be deducted for filling wrong or incomplete Roll Number.
   Warning : If a candidate is found copying or if any unauthorised material is found in his/her possession, F.I.R. would be lodged against him/her in the Police Station and he/she would liable to be prosecuted under Section 3 of the R.P.E. (Prevention of Unfairmeans) Act, 1992. Commission may also debar him/her permanently from all future examinations of the Commission.

निर्देश
1. सभी प्रश्नों के उत्तर दीजिए ।
2. सभी प्रश्नों के अंक समान हैं ।
3. प्रत्येक प्रश्न का केवल एक ही उत्तर दीजिए।
4. एक से अधिक उत्तर देने की दशा में प्रश्न के उत्तर को गलत माना जाएगा ।
5. प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं, जिन्हें क्रमशः 1, 2, 3, 4 अंकित किया गया हैं। अभ्यर्थी को सही उत्तर निर्दिष्ट करते हुए उनमें से केवल एक गोले अथवा बबल को उत्तर-पत्रक पर नीले वॉल प्वाइंट पेन से गहरा करना है ।
6. प्रत्येक गलत उत्तर के लिए प्रश्न अंक का 1/3 भाग काटा जायेगा। गलत उत्तर से तात्पर्य अशुद्ध उत्तर अथवा किसी भी प्रश्न के एक से अधिक उत्तर से है । किसी भी प्रश्न से संबंधित गोले या बबल को खाली छोड़ना गलत उत्तर नहीं माना जायेगा।
7. प्रश्न-पत्र पुस्तिका एवं उत्तर पत्रक के लिफाफे की सील खोलने पर परीक्षार्थी यह सुनिश्चित कर लें कि उसके प्रश्न-पत्र पुस्तिका पर वही सीरीज अंकित है जो उत्तर पत्रक पर अंकित है। इसमें कोई भिन्नता हो तो वीक्षक से प्रश्न-पत्र की ही सीरीज वाला दूसरा प्रश्न-पत्र का लिफाफा प्राप्त कर लें। ऐसा न करने पर जिम्मेदारी अभ्यर्थी की होगी।
8. मोबाईल फोन अथवा इलेक्ट्रोनिक यंत्र का परीक्षा हॉल में प्रयोग पूर्णतया वर्जित हैं। यदि किसी अभ्यर्थी के पास ऐसी कोई वर्जित सामग्री मिलती है तो उसके विरुद्ध आयोग द्वारा नियमानुसार कार्यवाही की जायेगी।
9. कृपया अपना रोल नम्बर ओ.एम.आर. पत्रक पर सावधानी पूर्वक सही भरें। गलत अथवा अपूर्ण रोल नम्बर भरने पर 5 अंक कुल प्राप्तांकों में से अनिवार्य रूप से काटे जाएंगे।

चेतावनी : अगर कोई अभ्यर्थी नकल करते पकड़ा जाता है या उसके पास से कोई अनधिकृत सामग्री पाई जाती है, तो उस अभ्यर्थी के विरुद्ध पुलिस में प्राथमिकी दर्ज कराई जायेगी और आर. पी. ई. (अनुचित साधनों की रोकथाम) अधिनियम, 1992 के नियम 3 के तहत कार्यवाही की जायेगी। साथ ही आयोग ऐसे अभ्यर्थी को भविष्य में होने वाली आयोग की समस्त परीक्षाओं से विवर्जित कर सकता है।

1   Fly ash is residue generated from

    (1)   Chemical Industries

    (2)   Hydro power plants

    (3)   Nuclear power plants

    (4)   Thermal power plants

2   The minimum longitudinal reinforcement in a column is provided as a percentage of cross—sectional area of the column. This percentage is

    (1)   0.6   (2)   0.8

    (3)   1.0   (4)   None of these

3   In the limit state design of concrete section the limiting value of the depth of the neutral axis $X_{u(max)}/d$ for steel grade Fe 415 is

    (1)   0.53

    (2)   0.48

    (3)   0.46

    (4)   0.42

4   Nominal mix M20 concrete represent the nearest ingredients ratio as

    (1)   1:3:6   (2)   1:2:4

    (3)   1:1.5:3   (4)   1:1:2

5   Bulking of sand is

    (1)   Compaction of sand

    (2)   Segregating sand of particular size

    (3)   Increase in volume of sand due to presence of moisture upto certain extent

    (4)   Type of sand

6   Vicats apparatus is used to perform the test of

    (1)   Fineness

    (2)   Consistency

    (3)   Soundness

    (4)   Compressive strength

7   If a material has identical properties in all directions it is said to be.....

    (1)   Homogenous   (2)   Isotropic

    (3)   Elastic   (4)   Orthotropic

8   If a composite bar of steel and copper is heated, the copper bar will be under.....
    (1)   Tension   (2)   Compression
    (3)   Shear   (4)   Torsion

9   Maximum bending moment in a beam occurs where.....
    (1)   Deflection is zero
    (2)   Shear force is maximum
    (3)   Shear force is minimum
    (4)   Shear force changes sign

10 Every material obeys the Hooks law within its
    (1)   Elastic limit
    (2)   Plastic limit
    (3)   Limit of proportionality
    (4)   None of the above

11 The lowest part of a structure which transmits the load to the soil is known as
    (1)   Super structure   (2)   Plinth
    (3)   Foundation   (4)   Basement

12 The distribution mains are designed for
    (1)   Maximum daily demand
    (2)   Maximum hourly demand
    (3)   Average daily demand
    (4)   Maximum hourly demand on maximum day

13 Disinfection of drinking water is carried out to remove
    (1)   Turbidity
    (2)   Colour
    (3)   Odour
    (4)   Bacteria

14 Minimum Dissolved Oxygen prescribed for a river stream, to avoid fish kills, is :
    (1)   2 ppm   (2)   4 ppm
    (3)   8 ppm   (4)   10 ppm

15 For Designing Railways Bridges, the load considered are as per
   (1) IRC class AA
   (2) IRC class 70R
   (3) EUDL as per bridges rules
   (4) IRC class 70R For Designing and class AA for checking

16 Grading of aggregate in a concrete mix is necessary to achieve
   (1) Adequate workability
   (2) Higher density
   (3) Reduction in voids
   (4) Better durability

17 The pH value of water for quality concrete shall be not less than
   (1) 2   (2) 4
   (3) 6   (4) 12

18 For bar in compression, the values of bond stress for bars in tension for M20 grade shall be increased by
   (1) 15%
   (2) 25%
   (3) 60%
   (4) None of above

19 Side face reinforcement shall be provided when depth of web in beam subjected to torsion exceed
   (1) 450 mm
   (2) 600 mm
   (3) 750 mm
   (4) 1000 mm

20 IRC class-B loading is intended for the design of
   (1) temporary bridges
   (2) bridge in B class cities
   (3) box-girder bridges
   (4) suspension bridges

21 For a bridge deck the most economical section shall be
   (1) A double Tee section   (2) An I section
   (3) Box section   (4) A channel section

22 The loss of prestress due to shrinkage of concrete is the product of
   (1) Modulus ration and percentage of steel
   (2) Modulus of elasticity of concrete and shrinkage of concrete
   (3) Modulus of elasticity of steel and shrinkage of concrete
   (4) Modular ratio and modulus of elasticity

23 Drops are provided in flat slabs to resist
   (1) Shear   (2) Bending moment
   (3) Thrust   (4) Torsion

24 Which of the following joint type is not eccentric ?
   (1) Lab joint
   (2) Single cover type butt joint
   (3) Double cover type butt joint
   (4) Both (2) and (3)

25 Racking force on a steel railway bridge is due to
   (1) Tractive effect of the driving wheel
   (2) Braking effect
   (3) Resistance offered by the bearing to the movement at the roller
   (4) Lateral movement of the train when moving on a straight track

26 The property by virtue of which a material deformed under the load is enable to return to its original dimension when load is removed.
   (1) Plasticity   (2) Ductility
   (3) Elasticity   (4) Malleability

27 Polar modulus of a section is a measure of strength of section in
   (1) Bending   (2) Shear
   (3) Torsion   (4) None of the above

28 Which of the following constituent, when present in excess quantity in clay causes the bricks to melt and distort during burning ?
   (1) Alumina   (2) Silica
   (3) Lime   (4) Alkalies

29 The advantage of adding pozzlains to lime is
   (1) To reduce shrinkage
   (2) Increase resistance to cracking
   (3) Increase resistance to chemical attack
   (4) All the above

30 Consider the following methods of preservation of timber :
   a   Pressure application   b   Brush application
   c   Dipping   d   Open tank application
   The correct sequence of these methods in the increasing order of their effectiveness is:
   (1) a, c, d, b   (2) c, d, b, a
   (3) b, c, d, a   (4) d, b, a, c

31 Four main oxides present in ordinary Portland cement are CaO, Al_2O_3, SiO_2 and Fe_2O_3. Identify the correct ascending order of their proportions in a typical composition of OPC :
   (1) Al_2O_3, Fe_2O_3, CaO, SiO_2
   (2) Al_2O_3, CaO, Fe_2O_3, SiO_2
   (3) Fe_2O_3, Al_2O_3, SiO_2, CaO
   (4) Fe_2O_3, SiO_2, Al_2O_3, CaO

32 Final setting time of OPC, should not be more than ___
   (1) 10 hrs.   (2) 8 hrs.
   (3) 6 hrs.   (4) None of the above

33 The radial splits which are wider on the outside of the log and narrower towards the pith are known as
   (1) Heart shakes   (2) Cup shakes
   (3) Star shakes   (4) Rind galls

34 In hydrometer analysis for a soil mass
   (1) Both meniscus correction and dispersing agent correction are additive.
   (2) Both meniscus correction and dispersing agent correction are subtractive.
   (3) Meniscus correction is additive and dispersing agent correction is subtractive.
   (4) Meniscus correction is subtractive and dispersing agent correction is additive.

35 A 600 mm square bearing plate settles by 15 mm in plate load test on a cohesionless soil under an intensity of loading of 0.2 N/mm². The settlement of a prototype shallow footing 1 m square under the same intensity of loading.

(1) 15 mm

(2) Between 15 mm to 25 mm

(3) 25 mm

(4) Greater than 25 mm

36 In a soil specimen 70% of particles are passing through 4.75 mm I.S. sieve and 40% of particles are passing through 75 micron I.S. sieve. Its uniformity coefficient is 8 and coefficient of curvature is 2. As per I.S. classification this soil is classified as   *.

(1) SP   (2) GP

(3) SW   (4) GW

37 The setting time of cement can be increased by the addition of

(1) Sodium

(2) Gypsum

(3) Calcium chloride

(4) Hydrogen peroxide

38 The modulus of rupture of concrete gives

(1) The direct tensile strength of the concrete

(2) The direct compressive strength of the concrete

(3) The tensile strength of the concrete under bending

(4) None of above

39 The bond strength of concrete increases with

(1) The quantity of steel

(2) The quantity of concrete

(3) The tensile strength of steel

(4) All of the above

40 In the limit state design of concrete structure, the strain distribution is assumed to be

(1) Linear   (2) Non linear

(3) Parabolic   (4) Parabolic and rectangular

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41 The side face reinforcement, if required, in a T-beam will be
   (1) 0.1% of the web area
   (2) 0.15% of the web area
   (3) 0.2% to 0.3% of the web area depending upon the breath of the web
   (4) Half the longitudinal reinforcement

42 Pathogenic bacteria
   (1) Are harmless
   (2) Cause diseases
   (3) Are called coliform organisms
   (4) Are visible to the naked eye

43 BOD of safe drinking water should be
   (1) Nil   (2) 10 ppm
   (3) 20 ppm   (4) 40 ppm

44 The tank which is generally used for plain sedimentation is of
   (1) Circular shape   (2) Rectangular shape
   (3) Hopper bottom shape   (4) Hexagonal shape

45 Alum increases
   (1) Hardness of water   (2) Acidity of water
   (3) Carbonates in water   (4) Sulphates in water

46 A G.I. pipe has a coating of
   (1) Zinc   (2) Lead
   (3) Silver   (4) Aluminium

47 Which type of material is used for cold mix ?
   (1) Grade 80/100 bitumen   (2) Cut back
   (3) Emulsion   (4) CRMB-55

48 Which stone is the best for road construction ?
   (1) Aggregate having impact value 18%
   (2) Aggregate having impact value 35%
   (3) Aggregate having impact value 39%
   (4) Aggregate having impact value 31%

49 Which type of stabilization will be the best for black cotton soil ?
   (1) Mechanical stabilization   (2) Soil-bitumen stabilization
   (3) Soil-cement stabilization (4) Soil-lime stabilization

50 Thickness of pavement will be maximum for
   (1) Soil with CBR 30%   (2) Soil with CBR 4%
   (3) Soil with CBR 20%   (4) Soil with CBR 24%

51 Unit of viscosity of bitumen is
   (1) gm/cc   (2) centipoises
   (3) cm/Kg   (4) °C

52 Ductility of bitumen ranges between
   (1) 10-20 cm   (2) 50-100 cm
   (3) 150-300 cm   (4) 50-75 cm

53 Grade of bitumen used for cold climate is
   (1) 30/40   (2) 60/70
   (3) 80/100   (4) 200/220

54 Specific gravity of bitumen is
   (1) 2.67   (2) 1.6
   (3) .97 to 1.03   (4) 1.8

55 Temperature of heating aggregate in hot mix is in range of
   (1) 100-120°C   (2) 150-163°C
   (3) 200-210°C   (4) 50-90°C

56 Which of the following is not related to shape of aggregate ?
   (1) Angularity number   (2) Elongation index
   (3) Stripping value   (4) Flakiness Index

57 Specific gravity of most of the coarse aggregate in concrete, lies between
   (1) 1.5 to 2.0   (2) 2.0 to 2.5
   (3) 2.5 to 3.0   (4) 3.0 to 3.5

58 A first class brick when immersed in cold water for 24 hours should not absorb water more than
   (1) 15%   (2) 20%
   (3) 22%   (4) 25%

59 Crushing strength of a first class brick should not be less than
   (1) 3.5 N/mm²   (2) 7.0 N/mm²
   (3) 10.5 N/mm²   (4) 14.0 N/mm²

60 The normal consistency of ordinary Portland cement is about
   (1) 10%   (2) 20%
   (3) 30%   (4) 40%

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61 For testing the compressive and the tensile strength of cement, the cement mortar is made by mixing cement and standard sand in the proportion of

(1) 1:2   (2) 1:3

(3) 1:4   (4) 1:6

62 The ratio of 28 days strength of cube to that of a standard cylinder is

(1) 0.8   (2) 1.25

(3) 0.67   (4) 1.00

63 The liquid limit of a soil mass is 20% and the plasticity limit is 25%, then the plasticity index of the soil mass is

(1) 5   (2) −5

(3) 0(PI always >=0)   (4) None of these

64 Grain size of a soil indicated that D_{10} = 0.005 mm. D_{30} = 0.003 mm and D_{60} = 0.006 mm. The uniformity coefficient of the soil is

(1) 0.5   (2) 2.0

(3) 6.0   (4) 1.2

65 Cross staff is an instrument used for

(1) Measuring approximate horizontal angles

(2) Setting out right angles

(3) Measuring bearing of the lines

(4) None of the above

66 In the prismatic compass

(1) The magnetic needle moves with the box

(2) The line of sight does not move with the box

(3) The magnetic needle and graduated circle is fixed to the box

(4) The graduated circle is fixed to the box and the magnetic needle always remains in the N-S direction

67 Theodolite is an instrument used for

(1) Tightening the capstan-headed nuts of level tube

(2) Measurement of horizontal angles only

(3) Measurement of vertical angles only

(4) Measurement of both horizontal and vertical angles

68 A vernier theodolite consists of
 (1) Leveling - head assembly
 (2) Horizontal - circle assembly
 (3) Alidade assembly
 (4) All of these

69 The temporary adjustment of a prismatic compass are
 (1) Centering   (2) Adjustment of levels
 (3) Adjustment of needles (4) Adjustment of van

70 The expansion in Portland cement can be tested by
 (1) Fineness test
 (2) Soundness test
 (3) Setting time test
 (4) Normal consistency test

71 According to Indian standard specification, the temperature for curing is
 (1) 5°C   (2) 10°C
 (3) 27°C   (4) 42°C

72 The aggregate which pass through 4.75mm IS sieve and entirely retain on 75 micron IS sieve is called
 (1) Cyclopean aggregate
 (2) Coarse aggregate
 (3) Fine aggregate
 (4) All-in-aggregate

73 Vicat's apparatus is used to perform
 (1) Fineness test   (2) Soundness test
 (3) Consistency test   (4) Compressive strength test

74 Venturimeter is used to measure
 (1) The velocity of a flowing liquid
 (2) The pressure of a flowing liquid
 (3) The discharge of liquid flowing in a pipe
 (4) The pressure difference of liquid flowing between two points in a pipe line

75 A pitot tube is used to measure the
    (1) Velocity of flow at the required point in a pipe
    (2) Pressure difference between two points in a pipe
    (3) Total pressure of liquid flowing in a pipe
    (4) Discharge through a pipe

76 The liquid used in manometers should have
    (1) Low density   (2) High density
    (3) Low surface tension   (4) High surface tension

77 A stretcher bond is usually used for
    (1) Half brick wall   (2) One brick wall
    (3) One and half brick wall   (4) Two brick wall

78 A type of flooring made with special aggregate of marble chips mixed
    with white and coloured cement, is called
    (1) Granolithic flooring   (2) Terrazzo flooring
    (3) Mosaic flooring   (4) Asphalt flooring

79 Frog is defined as a
    (1) Depression on the top face of a brick
    (2) Top most course of plinth
    (3) Brick whose one end is cut splayed or mitred for the full width
    (4) Brick used for the corner of a wall

80 In plane table survey, the instrument used to measure horizontal and
    vertical distances directly, is known as
    (1) Plane alidade   (2) Telescopic alidade
    (3) Tacheometer   (4) Clinometer

81 The top diameter, bottom diameter and the height of slump mould are:
    (1) 10 cm, 20 cm, 30 cm
    (2) 10 cm, 30 cm, 20 cm
    (3) 20 cm, 10 cm, 30 cm
    (4) 20 cm, 30 cm, 10 cm

82 In slump test, each layer of concrete is compacted by a tamping rod with
    (1) 20 blows   (2) 25 blows
    (3) 30 blows   (4) 40 blows

83 The mould size of the cube for testing the compressive strength of cement is

(1) 70.6 mm (2) 150 mm

(3) 50 mm (4) 75 mm

84 The water content in a soil sample when it continues to loose weight without loosing the volume is called

(1) shrinkage limit (2) plastic limit

(3) liquid limit (4) semi-liquid limit

85 The free fall of hammer for compaction of soil in standard proctor test is

(1) 10.5 cm (2) 20.5 cm

(3) 30.5 cm (4) 40.5 cm

86 If after every three or four stretchers, one header is used as a brick masonry wall, then the bond so formed will be called as

(1) English garden wall bond

(2) Flemish garden wall bond

(3) Stretcher bond

(4) Herring Bone bond

87 When the rise of an arch is more than the span, then the arch is called as ?

(1) Lancet arch (2) Venetian arch

(3) Drop arch (4) Ogee arch

88 The under surface of stair is called as

(1) Soffit (2) Cornice

(3) Wall plate (4) Scotia

89 The pitched roof which slopes in all the four directions is named as

(1) shed roof (2) bable roof

(3) hip roof (4) mansard roof

90 The wall friction of the retaining wall

(1) Decrease active earth pressure but increases passive earth pressure

(2) Decrease passive earth pressure but increases active earth pressure

(3) Decreases both active and passive earth pressure

(4) Increases both active and passive earth pressure

91 The dry density of a soil is 1.5 g/cm³. If the saturation water content is 50%, then its saturated density and submerged density will respectively be.

(1) 1.5 g/cm³ and 1.0 g/cm³

(2) 2.0 g/cm³ and 1.9 g/cm³

(3) 2.25 g/cm³ and 1.25 g/cm³

(4) 1.509 g/cm³ and 1.509 g/cm³

92 If the design speed is V kmph and deviation angle is N radians, then the total length of a valley curve in meters is given by the expression.

(1) $0.38(NV^3)^{1/2}$

(2) $0.38NV^{3/2}$

(3) $3.8NV^{1/2}$

(4) $3.8(NV^3)^{1/2}$

93 A body in natural equilibrium will rotate about the,

(1) Centre of gravity and Meta centre

(2) Centre of pressure and Meta centre

(3) Centre of gravity and centre of buoyancy

(4) Centre of gravity and centre of buoyancy and Meta centre

94 The flow in a pipe is neither laminar nor turbulent when Reynolds number is

(1) Less than 2000

(2) Between 2000 and 2800

(3) More then 2800

(4) None of the above

95 What is the maximum permissible slenderness ratio for steel ties likely to be subjected to compression ?

(1) 400

(2) 350

(3) 250

(4) 180

96   When an end of continuous beam is fixed, in Kani's method, the rotation contribution will be ?

(1) Zero

(2) EI/L

(3) 2EI/L

(4) 3EI/L

97   A prismatic beam fixed at both ends carries a uniformly distributed load. The ratio of bending moment at supports to the bending moment of midspan

(1) 0.5

(2) 1.0

(3) 1.5

(4) 2.0

98   For an isotropic, homogeneous and elastic material obeying Hooke's law, number of independent elastic constant is

(1) 2

(2) 3

(3) 9

(4) 1

99   The slenderness ratio of column is zero when

(1) Its length is exactly equal to the radius of gyration

(2) Its length is half the radius of gyration

(3) Total load carried is less than half the dead weight

(4) If the length is supported on all sides throughout its length

100 Turbidity in water is due to

(1) Algae

(2) Fungi

(3) Organic soils

(4) Finely divided particles of clay, silt and organic matter

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